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A PICEA FROM THE GLACIAL DRIFT.

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Early this year (1917) we received at our laboratory a piece of fossil wood from Mr. B. O. Wolden of Wallingford, Iowa. Wallingford is in the northern part of the state, about thirty miles southeast of Spirit Lake. Mr. Wolden secured this wood from a farmer near Wallingford. It was taken up with an eighteen inch auger drilling machine from a depth of eighty feet. Along with this wood, were found some well preserved bits of moss, some leaves or needles which resembled spruce needles, and a very small, immature cone.

The glacial drift which held this material is estimated to be at least 10,000 years old. In general appearance the wood is coated with claylike soil, and is light, much as old drift wood. It is in an excellent state of preservation. Under the microscope it may be noticed that the large cells at the beginning of the annual growth are in some cases broken in, or caved in, as though from pressure of the earth.

The following things may be seen in the sections. There are no tertiary spiral markings on the tracheids. The resin canals, pitting, and bars of Sanio prove it to be Abietinean; the normal resin canals put it in the Pineae. It is differentiated from Pinus by the thick walled secretory cells.

The tangential pitting is well marked, the rays are thick walled and Abietinean; the marginal trachieds are smooth walled, and in some cases there are masses of carbon in the pits.

According to Mr. Torrey of Harvard University, the interglacial wood is a Piceoxylon. It cannot be a Pseudotsuga for there is no evidence of spiral markings. Neither can it be a Larix for there is no dark colored heart wood. It can safely be placed as a Picea. The very interesting fact may be noted here that the White Spruce, or *Picea alba,* is not found growing in Iowa, nor closer than the Black Hills of Dakota. The range of the *Picea alba* is Newfoundland, Nova Scotia, and New Brunswick, westward through Quebec and Ontario to the forest limit of Manitoba. In the prairie region it is found in the sand hills bordering the first prairie steppe. Occasionally it is found in

the valley of the Saskatchewan and on the Bow river from Calgary where it is mixed with *P. Engelmanni.* It is found also on the coast of Maine, through northeastern Vermont and westward through northern Michigan and Minnesota to the Black Hills of Dakota, where it is known as the Black Hill Spruce. In Montana, along the Rocky mountains, it reaches its greatest development along streams and lakes in the Flathead region, at an elevation of 2,500 to 3,500 feet.

Picea alba, to which this fossil wood is probably nearly related, is characterized by thin summer wood, rather prominent, upwards of one-fourth the spring wood, from which the transition is gradual, rarely abrupt; the structure rather dense and the tracheids squarish. The spring wood is open; the tracheids are squarish-hexagonal, uniform in very regular rows, and the walls thin. The resin canals are scattering, and the rays are not very numerous. The bordered pits are found in one row, are numerous, and are round or elliptical. The orifice is usually large. In the summer wood the pits become remote or obscure, and the orifice usually becomes a prolonged slit. In the fossil wood we find a number of these points present, especially in the shape of the tracheids, the open spring wood with its thin walls, which failed to withstand pressure. The tangential pitting of the fossil wood is better marked than that of *Picea alba.* These and other similarities give us sufficient grounds to place them in close relation to each other.

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